

Need of Traceability of Farmed Fish in Indonesia

Joop van der Roest and Esther Kok

RIKILT – Institute of Food Safety, Wageningen University and Research Centre, Akkermaalsbos 2, 6708 WB Wageningen, The Netherlands.

The region of South East Asia and in particular Indonesia is renowned for its farmed (shell) fish, especially shrimps. Export of these shellfish and fish products to developed countries has increased over the years. However alerts of abuse of antibiotics in shrimp have resulted in export bans and increased inspection by competent authorities from the European Union (EU). Local companies and governments alike had to take swift action to inform raw material producers about the use of antibiotics and impose stricter legislation. With the flow of information up and down the supply chain regarding these issues that is besides residues and contaminants, the need for traceability records became apparent. The present study on the farmed fish sector in Indonesia, describes the attempts to introduce both theoretical and practical aspects of traceability systems to three links in the supply chain of farmed fish, in an effort to implement traceability on a national level.

Key words: farmed fish, traceability, supply chain

Introduction

The global food market has seen a dramatic development during the past 20 years. Raw materials and processed products are now transported all over the world and the need for traceability of these products is more apparent than ever. The main drivers for the implementation of traceability systems are to be found in the areas of food safety concern of consumers, guaranteeing traceable products by the producers and industry, and facilitating adequate legislation by governments. Recent food safety incidents and subsequent recalls by industry have emphasized the importance of traceability throughout the entire supply chain.

To enforce EU import regulations, the Food and Veterinary Office (FVO) of the European Commission carries out inspections in countries like Indonesia, Malaysia, Thailand and Vietnam on the processing of food products on a regular basis. These inspections were initiated as a result of the observed presence of residues and contaminants above set limits, in fishery and

aquacultural products. As a result, the countries in question have been faced with the implementation of various improvement programs. The majority of these programs are the result of recommendations made by inspection and expert teams of the Food and Veterinary Office after their missions in the countries mentioned during the period of 2004–2007. The reason for these missions was the relatively large number of notifications in the Rapid Alert System for Food and Feed from 2004–2007 in the countries of South East Asia.

Table 1 shows that on average the number of notifications per country over the years from 2004–2007, decreases. The open spaces in the table for Malaysia are due to the fact that no records were available in the DG-SANCO reports. In most cases the findings relate to antibiotics or growth promoting agents in farmed fish and heavy metals and histamine in captured fish.

Table 1 Notifications in Rapid Alert System for Food and Feed for fish products from South East Asian countries (DG-SANCO FVO mission reports 2006, 2007, 2008)

Country	2004	2005	2006	2007
Indonesia		46	34	16
Malaysia			14	
Thailand	5*	6**	28	17
Vietnam	16	36	28	14
Total	21	88	104	47

*) until October ***) from July

These food scandals lead to consumer demands for information about food products and focuses the attention of producing companies to incorporate data information and monitoring systems into their process. In general, larger companies have implemented sophisticated traceability systems for several years now, but this is not always the case for small and medium enterprises (SMEs). These processing companies are faced with aspects of such a system like costs and data security. For the suppliers of fish to these processing companies awareness is the main issue as they often question the necessity of traceability systems.

To successfully implement traceability systems, both governments and food companies need to recognise the importance of ensuring guarantees of food quality and food safety, as well as of disseminating information with regard to the source of the raw materials, food processes and the distribution of fish products to the end-user. Food regulations in many countries place the responsibility of food safety and the traceability of food products by producers. As traceability is now mandatory by importing nations like EU and United States of America (USA), various competent authorities in countries in South East Asia have issued new regulations which include aspects of traceability in the supply chain.

In this paper, the author presents work, which has been carried out for both governmental organisations and private industry. The project deals with creating awareness and further socialization of both gen-

eral aspects of traceability as well practical experiences of implementing traceability recording systems within the farmed fish sector in Indonesia. This paper focuses on the present situation of traceability amongst the small and medium fish processors and their efforts to integrate their suppliers and fish farmers into the traceability system. In order to achieve this integration a needs assessment in the field is performed to establish whether support for traceability systems is present. The paper describes how the needs assessment and consequent socialization training of traceability systems is fulfilled amongst representatives of the industry and government organisations alike. The final part of the paper discusses whether the farmed fish sector is yet ready to implement traceability on a pilot scale.

Regulatory aspects of traceability

The major export markets for Indonesia (EU and USA) have included traceability in their legislation. In the EU, regulation 178/2002 (better known as the General Food Law) enforces mandatory traceability for all food and feed products, as well as food producing animals, distributed between and to its member states. In the USA the 'Public health security and bioterrorism preparedness and response act' (US Bioterrorism Act of 2002) requires the registration of all domestic goods facilities and prior notification for all imports of food into the USA. Besides the regulatory imbedding of traceability, this subject is also defined by the

International Organisation of Standardisation (ISO 22005:2007) as 'the ability to follow the movement of a feed or food through specified stages of production, processing and distribution'.

According to the European legislation, food and feed business operators are responsible for identifying their suppliers and also need to be able to identify their customers. Therefore traceability systems and procedures need to be in place and the information, if required, must be made available to the competent authorities at all times. All food or feed placed on the market in EU member states shall be adequately labelled to facilitate identification and traceability. For an individual product, this may relate to the origin of raw materials, the production process and the distribution and location of delivery of the end product. This will result in traceability data such as the supplier (who), location (where), date/time (when), traceable item (what) and process (what happened).

In the USA, the Bioterrorism Act calls for one-up/one-down traceability for each link (as is also defined in GFL of EU) in the supply chain, to be enforced by the FDA Center for Food Safety and Applied Nutrition (CFSAN). The regulation requires that each company in the supply chain keeps information about the companies they received products from, and of companies they delivered products to, as well as of the transporters in between the steps in the supply chain. The regulations on data recording specify what information must be made available, and that the information should be able to be retrieved within a period of 24 hours.

Legislation on traceability is very similar in different parts of the world and thus standardisation of information will simplify traceability in all business operations along the supply chain.

As a result of the above mentioned developments, the Competent Authorities of Indonesia have issued a number of new regulations in the Quality and Safety Assurance System, which include the implemen-

tation of traceability systems in the supply chain of fish products. Legislation has been further extended with articles on the application of the principles of traceability and on the development of traceability systems for fish products throughout all stages of production, processing and distribution. Furthermore suppliers of fish products must be able to identify their farmers involved in the delivery of fish destined for the processing companies. The procedures for traceability shall be made available on request to the competent authorities. Processing companies must provide labels or information which are in compliance with the relevant identification and traceability provisions.

For the implementation of the above mentioned regulations a technical guide for the application of traceability in the supply chain of fish will be drafted. The objective of this guide will be to support the food safety control of fish products, to verify the origin of the products and to complete the information exchange in the supply chain. This guide will also provide the competent authorities with a tool to perform their quality inspections and means to certify products for export.

Practical aspects of traceability

Before entering the field of drivers of traceability, it is relevant to discuss the interest of stakeholders like consumers, industry and government and their relation to traceability. The responsibility for food safety and traceability is mainly in the hands of primary producers and industry, whilst consumers have the responsibility for treatment and preparing of food. The government sets limits, has its role as competent authority and coordinates actions in the case of incidents. Through its legislation the government has responsibilities regarding public health, bio security, market access and the ability to handle food safety incidents. The main driver for governments to introduce traceability system is consumer confidence.

For industry the main drivers for introducing traceability is the reduction of costs and to enable appropriate risk management, especially as a product recall of a specific (traceable) batch is more cost effective than going through the whole shipment to find contaminated products. Traceability also helps to manage risks arising from liability and brand protection issues.

Consumers benefit from traceability systems by knowing where their food comes from and resulting guarantees on origin and authenticity. As consumers have a great influence on the strategy and demands of supermarkets, this has further advanced the introduction of geographical labelling, sustainability claims and differentiation in high value products.

When implementing traceability at the company level, there is a choice between a paper based versus electronic based traceability system. It is important to realize that ISO22005-2007 does not distinguish between paper based and electronic based traceability systems. The paper based system is regarded as the more traditional method, where processes are recorded by procedures and checklists. The electronic based system is seen as a relatively new method, which makes use of different data entry tools. The positive and negative side of both paper based and electronically based systems are shown. But one must realise that neither paper nor electronic based system can provide any guarantee that the information is correct. Only integrity of data and user access and accuracy of data input will secure the most correctness.

The system should be classified by its performance, whilst bearing in mind the main characteristics like verifiability, consistent and equitable application, it should be result oriented, cost effective and practical to apply, but also be compliant with the relevant regulations or policies.

Some aspects should be taken in consideration before introducing a traceability system like:

- How to describe product and lot definition and identification

- Where to document the flow of materials and information including media for record keeping
- Which protocols for data management, recording and information retrieval to choose
- What to do in case of non-conformity and corrective action handling

All these practical aspects will be useful for stakeholders and government to enable them to develop and implement a traceability system in the near future.

Traceability of farmed fish in Indonesia

Background

The three main drivers in Indonesia for the introduction of traceability are: food safety, risk management and legislation. The objectives to introduce traceability on national level are basically to identify products and producers, as well as to create a national data base of locations of producers and processors. Government agencies are appointed to issue certificates. It was found that one of the largest challenges of traceability is the proper identification of a batch.

Needs assessment

To create awareness for traceability issues amongst the SMEs a needs assessment was undertaken in order to ascertain whether stakeholders are genuinely interested and willing to participate in traceability initiatives. Furthermore an assessment amongst links in the farmed fish supply chain (see figure 1) provides an opportunity to make an inventory of the present state of holdings with regards to registration, monitoring or recording of product and processing data.

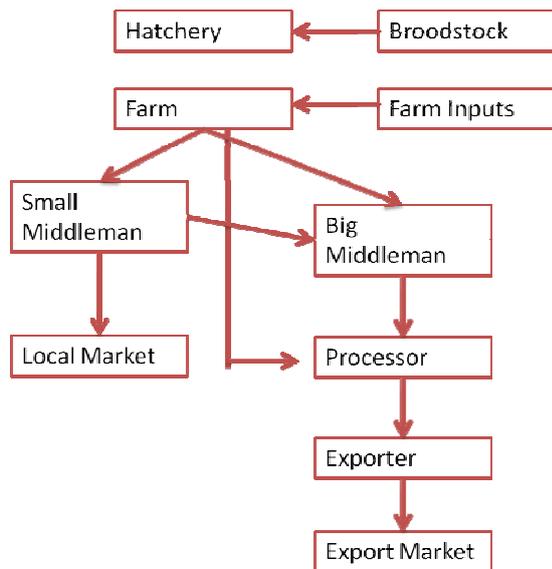


Figure 1 Farmed Fish Supply Chain

The inventory of the needs assessment showed that at hatchery and brood stock level the recording of traceability aspects is rather low and is limited to the registration of distributed fries, taking note of company name and date at which the delivery was made. At fish farm level of, for instance shrimp cultures, however ponds have their own identification with letter/number combination and pond size, stocking date and – density as well as hatchery source complete the registration. Specific parameters and data are recorded at regular time intervals during the day. Quality parameters of the water, which are monitored daily, include temperature, oxygen, pH, transparency, colour, ammonium and nitrite levels. Besides feeding data like code, rate and accumulated feed also growth and quality of the shrimp is checked using a square metre frame with mash lining.

The next link is the supplier or middleman of fish, as the collector of all fish from the farmers and is responsible for the delivery to the processor. The suppliers play an important role as fish farmers rely heavily on these intermediary agents. Similarly the processing companies also rely on these collecting agents for their supply of fish. However, these suppliers are lacking be-

hind regarding the implementation of traceability measures such as the recording of the origin of fish for the processing units. The suppliers use some form of registration for their actions, but to introduce a form of traceability system seems a bridge too far for many of them. Some larger suppliers have invested in hygienic facilities for receiving and storing fish before transport to the processor and also have made attempts to start to connect to the traceability system of the processors. In general, the awareness level regarding traceability in the previously described links is still rather low especially amongst the smallholders and this will need to improve.

Further downstream in the supply chain the recording of traceability data increases, as is stated at the fish processing companies. Because most fish farms are small to medium scale holdings their products are collected by suppliers or middlemen, who in turn deliver the unprocessed or semi-processed fish to the processing companies. Most of the processing plants that export their produce to EU countries, USA and Japan have quality and sustainability programs in place. In almost all cases Good Manufacturing Practice (GMP) and Hazard Analysis and Critical Control Points (HACCP) programs are present and are evaluated, validated or verified by government institutions (ministerial departments of fisheries), to guarantee compliance. Besides these quality programs, processing companies may also be certified for programs like Global Standard of British Retail Consortium (BRC), Friends of the Sea or Best Aquaculture Practices. Traceability aspects are taken seriously with specific attention being paid to information from the fish farms. The purchasing department of the processing company handles various forms related to the delivery of raw material (fish), including the official traceability code (OCT) of supplier. This code aims to describe the origin of the fish from province level right down to pond location. So it is by the incentive of the processing company that incorporates the supplier into the trace-

ability system of the supply chain. Once the fish is processed, the recording forms of finished product and loading take care of traceability output. At this moment almost all recording of traceability aspects is performed with paper-based systems.

Training

To introduce traceability to the small and medium enterprises (SMEs) in the region a socialization program was developed and workshops were organised in the respective districts. These workshops focused on the introduction and improvement of fish traceability in the upstream level of the supply chain. Participants of these workshops comprised of fish farmers, suppliers and quality assurance officers of processing companies as well as staff of governmental services of the Ministry of Marine Affairs and Fisheries. Basic knowledge of food quality and food safety was expected of all participants. The general aim of the training was to define, develop and demonstrate a fish traceability system geared at improving the present situation in the supply chain of farmed shrimp. The formulated objectives were described as:

- Describe the characteristics of traceability, definitions, drivers and general aspects.
- Distinguish the paper-based traceability compared to electronic traceability and define the best practices of record keeping.
- Design a demonstration of traceability project, including the involvement of other links in supply chain.
- Perform group assignments which includes critical points of traceability and general planning

The principle behind the training was to act in a customer driven way. The methodologies used in the training basically consisted of lectures, case studies and group assignments. The group assignments focused on hands on experience related to the implementation of traceability systems. In the

follow up of the training, participants were given the opportunity to forward suggestions for implementations and/or improvements of fish traceability in their respective holdings or companies. Also the integration of other organisations and stakeholder in the supply chain with regard to traceability were initiated, resulting in a blueprint for the sector. Furthermore possible administrative or legislative steps to be taken by the government to implement traceability on a national level, are foreseen in the near future.

It was discussed that the implementation of traceability systems in the supply chain of farmed fish is fragmented and varies according to structure and methodology and is absent at some stages altogether. Most processing companies record traceability data with a paper based system, but for suppliers and fish farmers these systems are relatively new and not yet in use. The awareness level regarding traceability in these links of the fish supply chain i.e. smallholders is rather low and needs to improve.

The training has met its required objectives and forms a basis for all stakeholders to start the pilot phase by implementing a traceability recording system amongst the links of the supply chain of farmed fish.

Conclusions and recommendations

Both government and industry related to farmed fish in Indonesia are aware of their responsibility towards food quality and food safety in general and towards traceability in as a means to assure these aspects. From government side initiatives on legislative side of traceability have been taken and a practical technical guide on traceability in the supply chain of farmed fish has been drafted. The processing companies are in favour of setting up a traceability framework for the supply chain of farmed fish which should include farmer, supplier, processor and customer.

To overcome shortcomings in data transmission between links in the supply chain should be tackled, as well as the embedding of mandatory traceability in national legislation, a needs assessment and subsequent training were organised.

The needs assessments carried out in Indonesia reveal that traceability is in the process of being established in processing companies that export fish products, over the last one to two years. Most of the traceability systems are paper-based system. It appears that some data on registration form are not included yet, for example the pond location. However it is foreseen that this information will be forthcoming in good cooperation with authorities and other stakeholders. Suppliers need to catch up on traceability if they are to fulfil their role in the supply chain according to the newly formulated regulations. Suppliers are now being coached by the processing companies to record data on traceability in such a manner that it will link up with systems that are already in place. Special attention is needed for the proper registration of the origin of the fish produce including the farmers and their ponds. At the larger farms registration also

takes place regarding technical data of the farmed fish.

The training activities for fish farmers, suppliers and processors have been a success in so far that participants proved their eagerness to learn, about and implement the traceability concepts.

It is recommended that follow up activities of the needs assessment and training are aimed at setting up pilots to define and demonstrate the structure and methodology for implementing a traceability system with food information for the entire supply chain, not just limited to the processing companies. In order to overcome the lack of a traceability system at the supplier and farmer level, the introduction of a paper-based recording system is suggested as a useful first step. At the processing level an electronic traceability monitoring system is foreseen in the near future. The benefit of this approach will be that small holders can thus join the fishery export market with relatively small adjustments to their current system and at the same time in full compliance with the requirements of importing countries.

References

- DG-SANCO FVO (2006). Mission report Thailand in order to evaluate control of residues and contaminants in live animals and animal products. Report 2006-8019, FVO, Dublin
- DG-SANCO FVO (2007a). Mission report Vietnam in order to evaluate control of systems in place governing production of fishery products intended for export to European Union. Report 2007-7291, FVO, Dublin
- DG-SANCO FVO (2007b). Mission report Vietnam in order to evaluate control of residues and contaminants in live animals and animal products. Report 2007-7322, FVO, Dublin.
- DG-SANCO FVO (2007c). Mission report Indonesia in order to evaluate control of residues and contaminants in live animals and animal products. Report 2007-7503, FVO, Dublin
- DG-SANCO FVO (2008a). Mission report Thailand in order to evaluate standards of control systems in place governing production of wild and farmed fishery products intended for export to European Union. Report 2008-7650, FVO, Dublin.
- DG-SANCO FVO (2008b). Mission report Malaysia in order to evaluate public and animal health controls and conditions of production of fishery products, live fish and their eggs intended for export to European Union. Report 2008-7679, FVO. Dublin.